WHAT IS CLAIMED IS:

1. An apparatus for carrying out a heterogeneously catalyzed reaction, comprising:

a stack comprising a plurality of layers on top of one another, each layer comprising a catalyst material and having channels for conducting educts of a reaction mixture and reaction products;

a plurality of end plates that bound said stack in a stacking direction, wherein at least one end plate has supplying or discharging lines that are connected with said channels;

wherein said plurality of layers have an edge seal (30) in an edge region or on a surface extending transversely to the stacking direction.

2. The apparatus of Claim 1, further comprising a gas-tight sheet that surrounds the plurality of layers.

3. The apparatus of Claim 2, wherein the gas-tight sheet has at least one opening for venting and comprises a catalyst.

4. The apparatus of Claim 1, wherein the catalyst material comprises a metallic support structure.

5. The apparatus of Claim 4, wherein the metallic support structure comprises dendritic copper.

6. A method for producing an edge seal for a stack of a plurality of layers, each layer comprising a catalyst material, said method comprising:

mixing a catalyst material with at least one additional material to form a mixture;

compressing the mixture, thereby forming a layer comprising the catalyst material and a gas-tight edge seal comprising the at least one additional material; and

stacking a plurality of said layers to form the stack.

7. The method of Claim 6, further comprising sintering said plurality of layers after said compressing.

8. A method for producing an edge seal for a stack of a plurality of layers comprising a catalyst material, said method comprising:

mixing a catalyst material with at least one additional material to form a mixture; and,

during a reaction, converting the at least one additional material to a gas-impermeable material forming an edge seal.

9. A method for producing an edge seal for a stack of a plurality of layers, each layer comprising a catalyst material, said method comprising:

compressing the catalyst material, thereby forming a layer;

stacking a plurality of layers to form the stack; and

applying a gas-impermeable and temperature-resistant material to said stack, thereby forming an edge seal.

10. The method of Claim 9, said applying is by immersing, plasma spraying, or flame spraying.

11. The method of Claim 9, further comprising applying a soldering foil on the stack; and exposing said stack to an elevated temperature wherein the soldering foil penetrates into the layers and forms a gas-tight edge seal.

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228/254
245
246
56.3

solder foil